

# ASL Proposal

## 1 Dataset

For my project, I will be using the dataset from <https://www.kaggle.com/grassknotted/asl-alphabet> which contains data for the letters a-z as well as space, nothing, and delete. This is a fairly large dataset with 29 classes and more than 1000 samples per class! For this reason, I will be using this dataset. <https://www.kaggle.com/kumawatmanish/deep-learning-sign-language-dataset> will also be used as it contains data for numbers 0-9 which was missing from the previous dataset. However, this dataset contains only 218 samples per class and were taken from students at a highschool in Turkey which may be a potential limitation of this dataset.

## 2 Methodology

### 2.1 Data Processing and Machine Learning Model

Upon researching possible machine learning models, the model that seems to be the most common in image classification appears to be the convolutional neural network model (CNN) and will therefore be the chosen model for this project. In terms of data pre-processing, the image sizes will be manipulated as there is a difference in image size between the first and second dataset. Outside of this, there will be no need for image pre-processing as this is an advantage of the CNN which takes the image's raw pixel data as input and learns how to extract features that would otherwise have been found during the pre-processing stage (e.g. textures and shapes).

### 2.2 Final conceptualization

I intend to showcase my project using a webapplication. This web app will involve the use of a webcam to detect the user's sign and then output the corresponding letter, number or choice of space, delete, nothing. Therefore, this web application shall serve as an interactive way of learning american sign language. Should time permit, an implementation of a messaging system between users would also be implemented to further the interactivity.

## 3 References

<https://www.kaggle.com/grassknotted/asl-alphabet>  
<https://www.kaggle.com/kumawatmanish/deep-learning-sign-language-dataset>  
<https://developers.google.com/machine-learning/practica/image-classification/convolutional-neural-networks>  
<https://towardsdatascience.com/image-pre-processing-c1aec0be3edf>  
<https://www.freecodecamp.org/news/asl-using-alexnet-training-from-scratch-cfec9a8acf84/>